

UNITED STATES DEPARTMENT OF AGRICULTURE  
Agricultural Research Administration  
Bureau of Entomology and Plant Quarantine  
233 Forestry Bldg., Colo. A & M  
Fort Collins, Colorado  
April 23, 1951

ENGELMANN SPRUCE BEETLE MORTALITY  
ON SHEEPHORN CONTROL UNIT, ARAPAHO NATIONAL FOREST  
CAUSED BY LOW TEMPERATURES JANUARY 31 AND FEBRUARY 1, 1951

As stated in the report of March 29, 1951, R. M. Loughridge and R. A. Payne revisited the Sheephorn control unit on the Kremmling control area by mechanized sled, operated by A. E. Bowles. They took samples from trees infested with Engelmann spruce beetle at 15 collection points. The samples were two 10" x 12" slabs above snow line from opposing sides of the bole of each tree. At each collection point two trees were sampled. Tree Number 2 at Point L had been treated with insecticide during the 1950 control operations. No samples were taken from below snow line or from the upper part of the bole.

The slabs were brought to the Fort Collins laboratory for examination. After exposure to room temperature for a week the slabs were examined for evidence of spruce beetle winter mortality.

A bark section 6" x 6" was removed from each slab; counts were made of dead and living larvae between the bark and wood.

The results of these counts are given in table 1.

Collection point B in the March 29 report was revisited and sampled. The point is designated J in this report. It is interesting to note that beetle mortality is again low, 22 percent. The earlier sampling showed a mortality percent of 25.

The overall mortality (five collection points) in the Sheephorn unit as reported on March 29 was 64 percent, the overall mortality in samples from 15 points in the unit this time is 45 percent. The range of mortality by collection points is from 22 percent at J to 98 percent at G. Only two points show mortality above 90 percent, B with 91 percent and C with a high of 98 percent.

There appears to be no clear-cut relationship between exposure (collection point) and insect mortality. Analyses of the data with reference to numbers

Spruce Beetle Mortality In Samples Above Snow Line  
Sheephorn Control Unit

Collection Point	Tree No.	Number of Larvae		Percent Mortality By	
		Dead	Alive	Tree	Collection Point
A	1	30	24	56	
	2	<del>20</del> 50	<del>2</del> 33	69	57
B	1	29	4	88	
	2	<del>22</del> 51	<del>1</del> 5	96	91
C	1	60	2	97	
	2	<del>24</del> 84	<del>0</del> 2	100	98
D	1	31	43	33	
	2	<del>18</del> 39	<del>17</del> 59	51	40
E	1	26	28	48	
	2	<del>24</del> 50	<del>16</del> 44	60	53
F	1	31	112	23	
	2	<del>31</del> 62	<del>81</del> 193	28	24
G	1	34	111	23	
	2	<del>42</del> 76	<del>89</del> 159	42	31
H	1	63	63	50	
	2	<del>26</del> 89	<del>15</del> 78	63	53
I	1	35	27	56	
	2	<del>41</del> 76	<del>33</del> 60	55	56
J	1	14	61	19	
	2	<del>17</del> 31	<del>46</del> 107	27	22
K	1	87	18	83	
	2	<del>22</del> 116	<del>73</del> 91	28	56
L	1	30	69	23	
	2	<del>22</del> 42	<del>12</del> 88	54	32

Spruce Beetle Mortality in Samples Above Snow Line  
Sheephorn Control Unit

Collection Point	Tree No.	Number of Larvae		Percent Mortality By	
		Dead	Alive	Tree	Collection Point
M	1	14	89	14	
	2	<u>31</u>	<u>51</u>	38	
		45	140		24
N	1	129	0	100	
	2	<u>27</u>	<u>74</u>	27	
		156	74		68
O	1	8	7	53	
	2	<u>16</u>	<u>44</u>	32	
		24	51		37
Total		988	1193		
Average mortality of all samples 45 percent					

of insects in the sample and mortality show no influence of population in the sample and mortality percentage.

The data reveal that the cold snap of January 31 - February 1, when the temperatures were recorded to have dropped to lows of  $-36^{\circ}$  and  $-56^{\circ}\text{F.}$ , killed many of the Engelmann spruce beetles above snow line but that the kill was not consistently high for the outbreak area as a whole and not even consistently high (80 percent or over) at more than 1/3 of the collection points.

Together with the observed and possible continuation of woodpecker feeding winter mortality due to the cold snap will lessen the amount of insecticide needed and the time required to treat the trees during control operations.

Later, it may be found also that the combined effects of the woodpeckers and the cold snap will eliminate some areas from the needs for artificial control. The data at hand now, however, is insufficient to assume or plan that at any of the control units, even at Red Table (four collection points) where mortality was high (above 80 percent) in every sampled tree, the job of spotting each infested tree or getting to that tree with the treating gear will be materially reduced.

Submitted by

*B. H. Wilford*

B. H. Wilford, Entomologist

*R. M. Loughridge*

R. M. Loughridge, Supervisory  
Control Aid

Forest Insect Laboratory  
Fort Collins, Colorado

cc: Deal (2)  
Regional Forester (2)  
White River N.F.  
Arapaho N.F.  
Boutt N.F.  
Orr  
Evenden  
Keen  
Furness  
Circulate Eastern Stations